(12) UK Patent Application (19) GB (11) 2 125 495 A

(21) Application No 8321544
(22) Date of filing
10 Aug 1983
(30) Priority data
(31) 8222846
(32) 13 Aug 1982
(33) Fed Rep of Germany (DE)
(43) Application published
7 Mar 1984
(51) INT CL³ F16D 13/50
(52) Domestic classification
F2C 1C9A2 1C9B2 1C9B3
(56) Documents cited
None
(58) Field of search
F2C
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(54) A diaphragm spring friction clutch provided with a rigid housing

(57) A friction clutch for motor vehicles comprises a sheet metal clutch housing 2 screwed to a cup-shaped flywheel 1, the fastening plane on the flywheel being advanced relative to the friction surface for the clutch disc 8 in the direction of the clutch housing, a pressure plate 5 connected to the clutch housing by straps 6 and a diaphragm spring 7 which is supported on the pressure plate with its outside diameter and on the clutch housing with a smaller diameter. The straps are tangential and extend approximately in the zone radially outside the diaphragm spring. The clutch housing (2) embraces the pressure plate (5) in the zone of the tangential straps (6) with a cylindrical collar (15) which is coaxial with the axis of rotation (11) and extends axially to close to the fastening plane (3) and which adjoins fastening zones (16) which rest in a flat manner on the flywheel in the fastening plane (3). The radially external edge of the fastening zones (16) is formed as a centring edge (17) which engages the internal circumference (17a) of a shoulder of the flywheel (1).

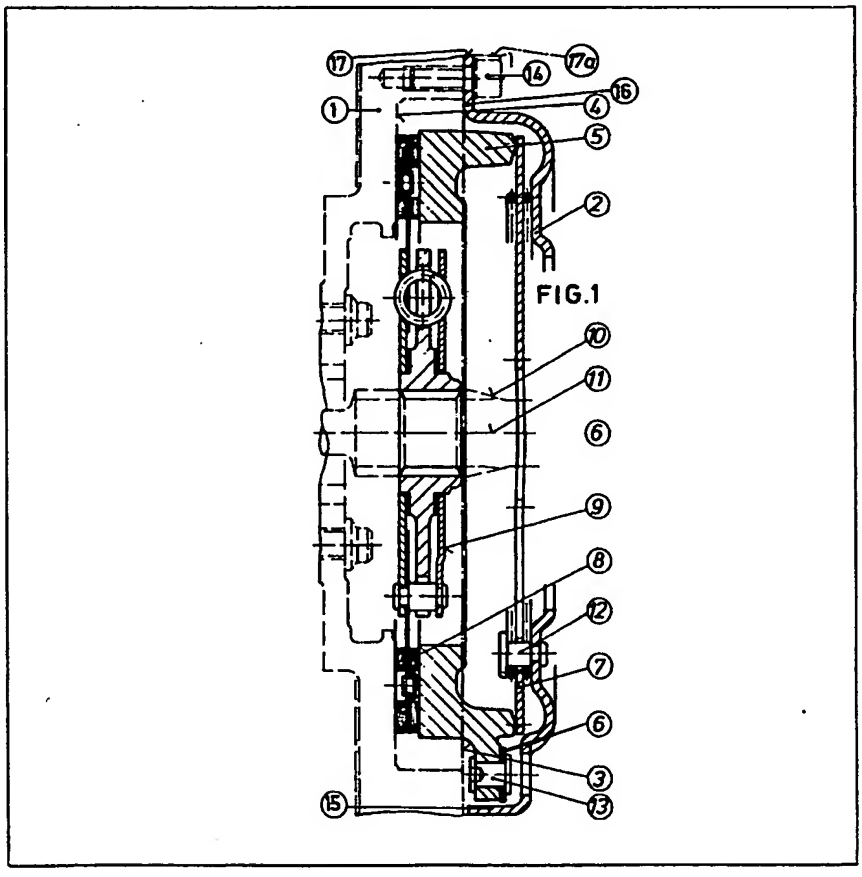

FIG.1

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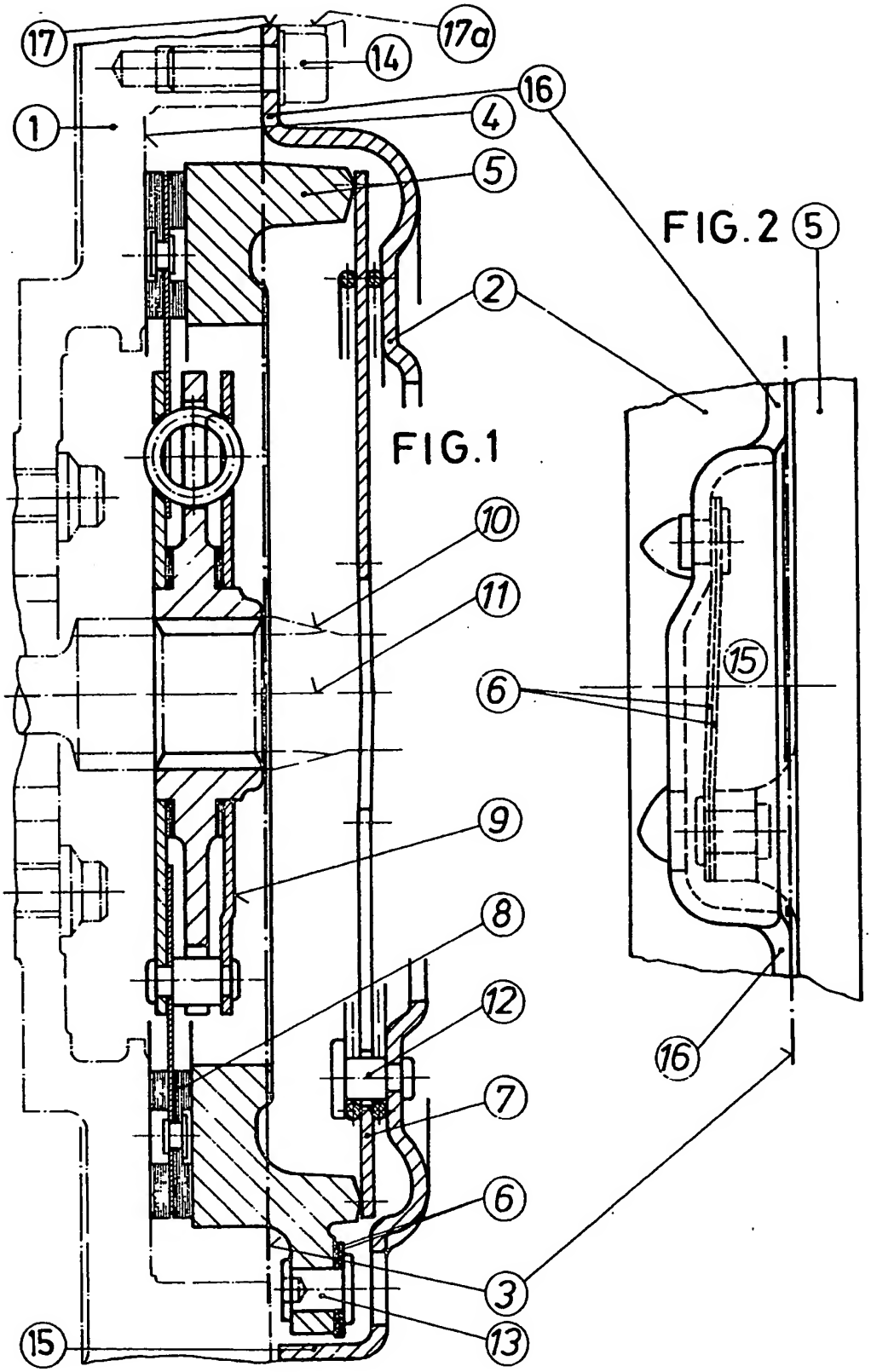

FIG.1

FIG.2

SPECIFICATION

A friction clutch provided with a rigid housing

The invention relates to a friction clutch which is intended, more especially, for motor vehicles and consists, inter alia, of a flywheel connected to the internal-combustion engine, a clutch housing screwed to the flywheel and consisting of sheet metal, the fastening plane on the flywheel being advanced relative to the friction surface for the clutch disc in the direction of the clutch housing and there being formed a cup-shaped flywheel, and of a pressure plate, which is arranged on the clutch housing so as to be secured against rotation but so as to be axially movable via straps, and of a diaphragm spring, which is arranged between the clutch housing and the pressure plate and which is supported on the pressure plate with its outside diameter and on the clutch housing with a smaller diameter, and of a clutch disc which is clampable between the flywheel and the pressure plate and which is arranged on a gear shaft so as to be secured against rotation.

Such a friction clutch is known, for example, from German patent specification 1 929 157. In the case of this clutch, the fixing of the pressure plate to the clutch housing is effected by straps which extend almost radially and are fastened to the pressure plate, on the inside diameter thereof, at corresponding eyes. Its fastening to the clutch housing as effected by riveting to a flat zone which extends in parallel with and at an axial distance from the fastening plane of the clutch housing on the flywheel.

It is the object of the present invention to provide a friction clutch according to the prior art which has a particularly stiff clutch housing and which makes provision for sufficient space for the accommodation of a torsional vibration damper in the clutch disc.

According to the invention there is provided a friction clutch which is intended, more especially, for motor vehicles and consists, inter alia, of a flywheel connected to the internal-combustion engine, a clutch housing screwed to the flywheel and consisting of sheet metal, the fastening plane on the flywheel being advanced relative to the friction surface for the clutch disc in the direction of the clutch housing and there being formed a cup-shaped flywheel, and of a pressure plate, which is arranged on the clutch housing so as to be secured against rotation but so as to be axially movable via straps, and of a diaphragm spring, which is arranged between the clutch housing and the pressure plate and which is supported on the pressure plate with its outside diameter and on the clutch housing with a smaller diameter, and of a clutch disc which is clampable between the flywheel and the pressure plate and which is arranged on a gear shaft so as to be secured against rotation.

The straps are designed at tangential straps and extend approximately in the zone radially outside the diaphragm spring between the pressure plate and the clutch housing.

The clutch housing embraces the pressure plate in the zone of the tangential straps with a cylindrical collar which is coaxial with the axis of rotation and extends axially to close to the fastening plane. The clutch housing has in the circumferential direction, adjoining the cylindrical collar, fastening zones relative to the flywheel which rest in a flat manner on the fastening plane. The radially external edge of the fastening zones is formed as a centring edge for the clutch housing in the flywheel and lies on the same diameter as the cylindrical collar.

Due to the arrangement of tangential straps approximately in the zone radially outside the diaphragm spring, there is provided sufficient space in the zone radially inside the pressure plate in order to accommodate even a bulky torsional vibration damper. In the zone of the tangential straps, the clutch housing is provided with a collar which extends cylindrically and coaxially with the axis of rotation and surrounds the tangential straps and stretches to the vicinity of the fastening plane. By this means, the clutch housing is also stiff in the zone of the tangential straps since the cylindrical collar constitutes a high moment of resistance to deformation of the clutch housing by the biassing force of the diaphragm spring in view of the intended individual fastening points on the flywheel. The clutch housing has in the circumferential direction, adjoining the cylindrical collar, fastening zones relative to the flywheel which rest in a flat manner on the fastening plane so that the clutch housing cannot sag between these fastening zones. The radially external edge of these fastening zones serves as a centring edge for the clutch housing in the flywheel and this centring edge has the same diameter as the cylindrical collar. This stiffening of the clutch housing in the zone of the tangential straps by the cylindrical collar alone renders its appropriate to centre the clutch housing relative to the flywheel on its external circumference, since if the clutch housing is not torsionally stiff the centring edge can vary in diameter to a greater extent than is desired for centring.

The invention will be explained in more detail with the aid of an exemplified embodiment. In the drawing:

Figure 1 shows a longitudinal section through a friction clutch, and

Figure 2 shows a view radially from the outside of the zone of the tangential straps.

In Fig. 1 there is shown a friction clutch which consists, inter alia, of a flywheel 1 which is connected, so as to be secured

against rotation, to the crankshaft of the internal-combustion engine not shown. The flywheel 1 has a friction surface 4 which extends perpendicularly to the axis of rotation 11 and opposite to which there is provided a pressure plate 5. To the flywheel 1 there is screwed by means of screws 14 a clutch housing 2 which is a deep-drawn sheet-metal part. The pressure plate 5 is fastened to the clutch housing 2 by means of tangential straps 6 so as to be secured against rotation but so as to be axially movable. The tangential straps 6 are connected to the pressure plate 5 on radially outwardly projecting tabs by means of fastening rivets 13. Between the pressure plate 5 and the clutch housing 2 there is arranged a diaphragm spring 7 which is supported on the pressure plate 5 with its outside diameter and on the clutch housing 2 with a smaller diameter. For this purpose, there are provided several supporting rivets 12, which are distributed over the circumference, with the interposition of thrust rings, if necessary. The biassing of the diaphragm spring 7 is so directed that the pressure plate 5 is loaded in the direction of the friction surface 4 of the flywheel 1 and can thus clamp between itself and this friction surface 4 a clutch disc 8 which is arranged on the gear shaft 10 as as to be secured against rotation but so as to be axially displaceable. This clutch disc 8 comprises a torsional vibration damper 9 which is located in the space radially inside the pressure plate 5. The clutch housing 2 is deep-drawn from sheet metal in approximately the shape of a cup and has several fastening zones 16 which are distributed over the circumference and rest on the fastening plane 3 of the flywheel 1 and are fastened there to the flywheel 1 by means of screws 14. In the circumferential direction between these fastening zones 16, the clutch housing 2 is formed in the shape of a cup in the zone of the tangential straps 6 in such a way that a cylindrical collar 15 embraces the radial straps 6 in the axial direction and at a radial distance, the cylindrical collar 15 being brought to close to the fastening plane 3 in the direction of the flywheel 1. The fastening zones 16 of the clutch housing 2 are connected without a transition to the end zones of the cylindrical collar 15 in both directions of rotation and form self-contained units. This self-contained unit of the clutch housing 2 ensures an extraordinarily high stiffness of this clutch housing so that this housing cannot be distorted during the assembly operation by the biassing force of the diaphragm spring 7. This makes it possible to provide on the radially external circumference of the clutch housing 2 in the fastening zones 16 a centring edge 17 which engages in the internal circumference 17a of a corresponding shoulder of the flywheel 1. This centring edge 17 remains so constant in diameter during the assembly operation that all parts of the clutch housing 2 and the flywheel are aligned and that the balancing carried out prior to the assembly of the clutch is maintained.

In Fig. 2, there is shown from radially outside the view of the zone of a cylindrical collar 15 with the omission of the flywheel 1. There is thus discernible from this representation the clutch housing 2 with the cylindrical collar 15 and the pressure plate 5. Furthermore, the fastening plane 3 is shown in dash-dotted lines and the tangential straps 6 are also indicated. It can be seen in this view that the cylindrical collar 15 ends in both circumferential directions in the fastening zones 16 which rest directly on the fastening plane 3. Herein, the cylindrical collar 15 has been taken to close to this fastening plane 3. However, a short safety distance must be observed.

CLAIMS

1. A friction clutch which is intended, more especially, for motor vehicles and consists, inter alia, of a flywheel connected to the internal-combustion engine, a clutch housing screwed to the flywheel and consisting of sheet metal, the fastening plane on the flywheel being advanced relative to the friction surface for the clutch disc in the direction of the clutch housing and there being formed a cup-shaped flywheel, and of a pressure plate, which is arranged on the clutch housing so as to be secured against rotation but so as to be axially movable via straps, and of a diaphragm spring, which is arranged between the clutch housing and the pressure plate and which is supported on the pressure plate with its outside diameter and on the clutch housing with a smaller diameter, and of a clutch disc which is clampable between the flywheel and the pressure plate and which is arranged on a gear shaft so as to be secured against rotation, characterised by the following features:–

a) The straps are designed as tangential straps (6) and extend approximately in the zone radially outside the diaphragm spring (7) between the pressure plate (5) and the clutch housing (2),

b) the clutch housing (2) embraces the pressure plate (5) in the zone of the tangential straps (6) with a cylindrical collar (15) which is coaxial with the axis of rotation (11) and extends axially to close to the fastening plane (3),

c) the clutch housing (2) has in the circumferential direction, adjoining the cylindrical collar (15), fastening zones (16) relative to the flywheel (1) which rest in a flat manner on the fastening plane (3),

d) the radially external edge of the fastening zones (16) is formed as a centring edge (17) for the clutch housing (2) in the flywheel (1) and lies on the same diameter as the cylindrical collar (15).

2. A friction clutch substantially as described with reference to Figs. 1 and 2 of the accompanying drawings.

Printed for Her Majesty's Stationery Office
by Burgess & Son (Abingdon) Ltd.—1984.
Published at The Patent Office, 25 Southampton Buildings,
London, WC2A 1AY, from which copies may be obtained.